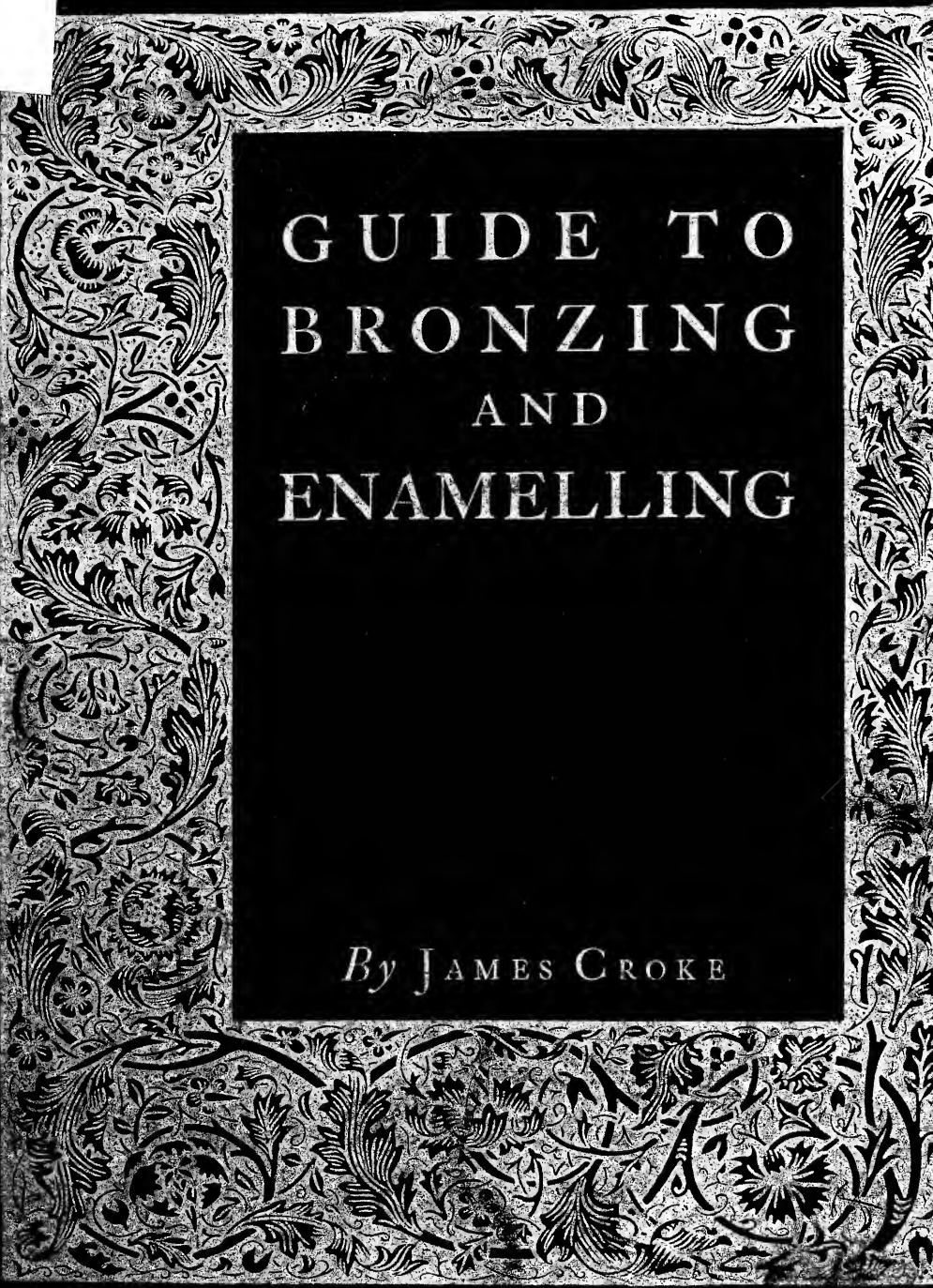


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The book cover features a wide, ornate border of intricate floral and foliate patterns, likely a woodcut or engraved design. The patterns include various leaves, flowers, and scrolling vines, creating a dense and decorative frame around the central text area.

# GUIDE TO BRONZING AND ENAMELLING

*By* JAMES CROKE



# Guide

TO

## Bronzing and Enamelling

BY

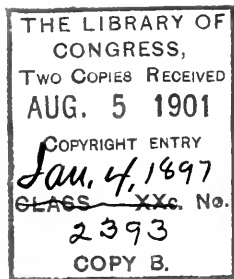
JAMES CROKE.

REPRESENTING

THE FUCHS & LANG MANUFACTURING CO.,

29 Warren St., New York City.

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## TO THE READER.



HAVING fully decided upon the style of architecture and the inside finish of your house the question comes, How can we furnish our home to beautify it according to the most recent ideas?

With a view to assisting those seeking such information, and in response to repeated requests from architects, anticipating builders, contractors, patrons and others for particulars, I have concluded to put, in as concise a form as possible, a few of the standard rules to be followed to insure the best and most lasting results for interior decoration, where bronzes and enamels are to be used; and the proper method of applying Bronze Powders by lithographers and printers.

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## BRONZING *and* ENAMELLING

### BRONZE AND BRONZING.

**B**RONZING is the process of covering metal, ivory, wood, plaster and clay figures so as to communicate to them the appearance of ordinary bronze.

Bronze is a reddish yellow, fine-grained alloy of copper and tin, in variable proportions. It was early known, and what is usually spoken of as brass in regard to the ancient nations was in reality bronze. The brass, or bronze, referred to in the Bible was probably composed of copper and tin, though some translators consider it likely to have been copper alone. The examinations of the most ancient coins and metallic ornaments and implements leave no doubt as to the acquaintance of the ancients with bronze; so much so that in the antiquarian history of European nations there is a distinct period styled the Bronze Period. At the present time bronze is largely used for house and church bells, Chinese gongs, ordnance or cannon metal, and speculum or telescope metal.

## GOLD BRONZE.

**G**OLD powder is used for the finer work, and is prepared by grinding gold leaf with honey, on a stone slab, till a very fine state of division is obtained, then washing out the honey, and drying the gold powder. Inferior gold leaf, or that which contains much silver and copper, yields the German gold powder employed in bronzing.

Copper powder is prepared by introducing an iron bar or plate into a solution of copper, when the latter is precipitated as a finely divided red powder.

Mosaic gold, or Musivum, is made by fusing a pound of tin, introducing a half-pound of mercury, allowing the alloy or amalgam to cool, then pulverizing and grinding up with a half-pound of sal-ammoniac and seven ounces of sublimed sulphur. Ultimately the whole is subjected to the process of sublimation, when the tin, as a brilliant yellow powder, resembling gold, is left in the subliming vessel. The color of mosaic gold may be deepened by the addition of red oxide of lead, and it then assumes a copper tint.



## COPPER.

**C**OPPER is one of the most anciently known metal, and its name is derived from the island of Cyprus, where it was first obtained by the Greeks. In the earlier times, copper does not appear to have been employed by itself, but always in admixture with other metals, principally tin, forming what is now called bronze.

There is every reason to believe that, next to the large quantities of tin which they obtained, one of the greatest inducements which the Phœnicians had in making searches for metal in Great Britain was the copper which they procured in their workings at Cornwall.

## BRASS.

**B**RASS is an alloy of copper and zinc, largely used for household furnishings, certain parts of machinery, and other ornamental and useful ornaments and articles. Technically, the term “Brass” is extended so as to include compounds of copper and tin, as in brass ordnance; but such alloys of copper and tin, though styled hard “brass,” are more strictly varieties of bronze. In the manufacture of bronze on a large scale, two parts by weight of copper to one part of zinc are used, the zinc being one half the weight of copper; but alloys are made for particular purposes with less or greater proportions of zinc.

## TO DO BRONZING SUCCESSFULLY.

**B**RONZING is carried to a greater success nowadays than it ever was before. This is partly on account of the superior bronze powders we now obtain and also of a better knowledge of their manipulation and application. Bronzing can be done now to look almost as well as gold leaf, and for all interior work is practically as good. The bronzing that was done only a few years back was a sorry specimen to gaze upon after the rays of light had cast their brightness upon it a few days. Not so now. Light has little effect upon it; only the severe changes of the elements mar its beauty.

All metals, except gold and aluminum, will tarnish with exposure, and it is folly to suppose any liquid substance will hold them intact. We may prolong their polished brightness by successful manipulation and the use of proper liquids, but time and the elements will cause their decay sooner or later.

How to extend their life and promote their beauty to the best advantage is the purpose of this work. Many a painter in the small cities (and the large ones, too, for that matter), might do quite a little shop business during the slack times of winter and midsummer, by supplying himself with a variety of the best grades of bronzes and doing a little hustling, either by samples, advertising, or both. The fashionable parlor is not complete now without

a gilded chair, which any painter can do and do handsomely, and to last, by following instructions herein given. Not only the chair, but a thousand other articles too numerous to mention, can be done by the house painter and decorator with profit. A few other articles we might mention are frames, picture mouldings, hall trees, lamps, gas fixtures, and entire bed-room sets in colors, stripes and ornaments. And besides the various bric-a-brac ornaments, there are show-card signs, store fronts, carriage gears, both for the babies and the grown-up folks; then, again, the various wire screens, iron guards and railings look well touched up in bronze. And further mention could be made of the decorative work in stencil and fresco that is in this line of bronzing also.

Let me say to all amateurs in bronze manipulation, Get the best. The extra cost is nothing in comparison to the satisfaction of doing work that will be pleasing, satisfactory and lasting; and besides, the better class of bronzes are so much finer they spread out to a greater extent, and the prices are not so much at variance as at first supposed. One must not always suppose that because an article is higher in dollars and cents it is the most expensive. It's like buying three pounds of cheap color to tint a pot of lead, when one pound of good color would have done the work at a third less outlay.

The most successful method of bronzing, whether

a chair, frame or store front, is to apply the bronze dry. Get your surface as clean and smooth as possible and then give it a coat of almost flat lead, tinted a little toward the color of bronze. But do not try to get the color too close in tint for the first coat. The reason is this : Suppose you mix your color for the first and second coats the same shade ; it is ten chances to one that there will be "holidays" in the second coat, and when you apply your bronze there will be places where it will not take, causing you much trouble in touching up. Suppose you are going to apply copper bronze ; tint your lead for the first coat with orange chrome—not too dark, but just a medium shade. Put in enough "turps" and driers to insure a good, hard surface when dry. Remember that too much japan and oil never dries crisp and hard, but, on the contrary, is always gummy. Your next coat should be mixed to approach the color of the copper. Orange chrome and Indian red will do as well as any combination you can obtain. Sizing for store fronts and all large surfaces should be mixed with nearly all boiled oil and a little carriage varnish ; for vehicles, coach varnish and a little oil ; for chairs, frames, and small articles, gold-size Japan will be best. Now watch your surface, and when it dries sufficiently to become slightly "tacky," apply the bronze with a piece of raw cotton and a soft-hair brush. The places not accessible to the cotton must be done with the brush.

## FOR RADIATORS.

Use a thin, light-flowing liquid, made of good copal varnish, boiled, and diluted with benzine, as this will not discolor the bronze, and the drying capacity of benzine is such as to leave the bronze in its natural lustre, without giving it time to discolor.

Of course you can take more chances with the storefront mixture. The bronze will take this many hours after it is apparently in the right condition, which will give you time to get over the whole without danger of being too dry. Not so with your chair mixture. If this gets too dry, the bronze will only take in patches; therefore it is necessary to commence the work of applying the bronze just as soon as you can brush it on without moving the surface. Stand the article away to harden some, after which the surplus is to be all cleaned off, and, with a piece of chamois skin, you can polish your work up. It will be seen at once that the dry application is much superior to using the bronze in liquid form. Here the metal appears in all its native beauty, whereas in mixing with the liquid, it has a sickly, deathly appearance, the same as gold leaf appears after being varnished. Never use a rosin varnish about bronze. Rosin has a tendency to color metals very rapidly. Although glue, with a little syrup added, may be successfully used for bronzing on cardboard signs or any water-color work, yet gold-sized japan is much preferable.

In bronzing silk, cloth or banner work of any kind, two coats of sizing are always necessary. The first coat may be of glue, or the two coats gold size or good varnish. Use no oil, especially for first coating, on any kind of fabric work.

In bronzing plaster casts, the porous surface should be well filled with two or three coats of paint before the sizing is applied.

In bronzing in imitation of old copper, the same process is gone through as above; then the work is shaded up with walnut graining color in dappled form or in patch reliefs. The shading must be done in an artistic manner. The color must not be too prominent and must be well blended off to have the retreating edges almost imperceptible. The work is then varnished with a good rubbing varnish and rubbed to a wax finish. If a high polish is desired, without regard to expense, two coats of rubbing varnish are applied, after which it is rubbed to a smooth, level finish and re-varnished with a first-class body varnish. The varnish must be flowed on quite freely and in sections to insure a perfect and high-gloss surface.

In bronzing carriage gears, the work is brought up to the finishing varnish in colors to suit the bronze desired. The surface is then sized, bronzed, and, when dry, polished, thoroughly dusted, washed, and the finishing varnish applied.

## HINTS ON RADIATOR BRONZING.

**A**N occupation which has originated since the systems of steam and hot-water heating have been so extensively introduced is that of painting and decorating radiators. Here we have a new industry, and one that commends itself as filling a long-felt want. The refining influence of art and the conquests of gilt and paint, bronze and enamel, over the rough and unfinished casting, are sure to please the eye and taste of all who use radiators.

The business of decorating radiators of all kinds has become an established trade, and the blending of colors, both in bronze and enamel, to match wall paper, tinted walls, woodwork, carpets, etc., causes instant admiration when practically carried to perfection. A radiator is considered by some as an eyesore to a room, but under the artistic brush of a practical radiator decorator it is soon changed to a positive ornament. The application of bronze or special radiator enamel will not effect the radiation of the pipes in the least. After radiators have been in use for a short time they begin to look shabby, there is every need of their being attended to by some one who is familiar with the work. The demand for this class of work is very extensive.

For the benefit of those who have not studied this question more closely, we give a few hints regarding the

decoration of radiators with bronze. A majority of radiators today are simply done in gold bronze or gilded. This is the cheapest method employed in finishing radiators by steam fitters and contractors; and because the fitter finds it hard to suit the tastes of the person having the work done. This is a frequent occurrence with fancy and ornamental radiators. Why? Because the steam fitter has not the experience in the shading and blending of colors that a practical radiator decorator has acquired through his daily work and years of experience, and, in most cases where an artistic decoration is required, will use a horrible combination of color, at least not satisfactory to the parties having the work done.

Combinations of colored bronzes whose shades are near to each other ought to be avoided carefully, especially gold with any other color with a light contrast. Following are a few very pretty combinations in bronze where two colors are used:

Gold body with Aluminum on ornamented part.

Gold body with Green on ornamented part.

Gold body with Copper on ornamented part.

Copper body with Gold on ornamented part.

Copper body with Green on ornamented part.

Green body with Copper on ornamented part.

Green body with Gold on ornamented part.

Aluminum body with Gold on ornamented part.

And many other combinations when the colors of the room require it. A beautiful and quiet effect is pro-



duced by bronzing a radiator with black bronze and decorating the ornamental parts with gold bronze.

### OXIDIZED SILVER.

An oxidized finish makes a very pleasing effect for a radiator. To produce this finish the following rule should be observed: First clean the radiator of all rust and oil, then bronze it with a good quality of aluminum bronze. When thoroughly dry and hard, apply one thin coat of white shellac. When thoroughly dry cover the surface with an oil black; allow this to set for a short time, then wipe all the black possible from the surface. If carefully done will leave an oxidized surface.

For obtaining best results in matching wall paper with a cream-colored ground, mix gold and aluminum bronze together in about equal parts. Keep it well stirred, and apply carefully. This combination has been used by the writer with good results.

The question has often been asked of the writer, How many feet of radiation will one pound of gold bronze cover? This is a question that is impossible to answer, as it depends entirely upon the persons who use the material, whether they will mix the bronze and liquid in thinner or thicker proportions. A fairly good job, however, is done by using one pound of bronze to one quart of bronzing liquid. The same will cover about one hundred square feet of radiator surface in any of the

standard radiators. It is the opinion of many persons—which I have found in my experience to be a mistaken one—that a higher-priced bronze will cover more surface than a cheaper grade. I have repeatedly shown this to be a mistake, and could never get more work out of a higher-grade bronze than out of the cheaper grades. But the great advantage of higher and medium grades of gold bronze is that they contain a better material, and consequently will look much brighter and more lustrous than the cheaper grades.

## PATENT BRONZES.

**N**EVER use the so-called patent bronzes for radiator decoration. These bronzes are originally silver bronzes, and their high, brilliant color is given with aniline. The heat of the radiator will destroy the aniline color in a very short time, and nothing will be left but a soiled, dull silver bronze. If the above hints are taken advantage of, the decoration of radiators (in itself not an easy matter) will be greatly simplified, and the fitter and consumer will doubtless be helped in their efforts to please themselves and others.

Some time ago the writer made experiments with these so-called patent bronzes, the results of which may be interesting to the reader. Applying to the surface of several stones a coat of the various patent bronzes, also

gold and aluminum, in order to determine the durability of the various bronzes, with results as follows: After bronzing the stones they were exposed to the elements, and within two weeks the gold and aluminum bronze, while having lost its lustre, retained its original color; while the patent bronzes, exposed to the weather the same length of time, had bleached out, eliminating all traces of their original shades, leaving the surface of the stones with a dull silver effect, which substantiates beyond any doubt what the writer has already stated, that the patent bronzes are produced from silver bronze and colored with aniline.

Bronze has come down in price to such a degree that the consumer can buy it at \$1.00 to \$2.50 per pound in a quality equal to the one for which he used to pay from \$3.00 to \$6.00 per pound. But care ought to be used to buy only bronze powder which shows perfectly dry and brilliant in the bulk, and is made with the addition of as little oil as possible, as this will keep its original color a great deal longer than bronze that has been made with oil. And this brings us to the leading question in radiator bronzing.—Which bronze will keep its color longest on radiators?

Bronze, with the exception of aluminum and silver bronze, is made out of copper, etc., and the tendency of heat is to darken the color of copper. The consequence is that all bronzes, with the above exceptions, will turn

darker if exposed to the heat for any length of time. All gold bronzes will turn to a darker orange-like color in time, but if worked properly in the way stated above, a "dry-ground" bronze will keep a little longer than any of the oily, so-called "fine-ground" bronzes, owing to the absence of oil, which is likely to change the bronze to a blackish yellow. If an absolutely untarnishable bronze is required, let the fitter or consumer use "pure aluminum bronze," which will never change its color.

### ALUMINUM BRONZE.

**A**LUMINUM bronze cannot be too highly recommended for radiators in place of silver bronze. It is whiter in color, more brilliant in lustre, and, as stated above, absolutely untarnishable if pure. Heat will not affect its color. The price of aluminum bronze is very reasonable, and for all practical purposes it is cheaper than silver bronze. One pound of aluminum bronze contains a quantity equal to three pounds of silver bronze, and it is the only bronze material that can be ground fine enough to cover more surface than other bronzes.

I desire to caution the reader against the adulterated aluminum bronze, of which considerable is sold. This bronze contains about three quarters of aluminum, and one quarter of silver bronze is added, in order to

meet a cheaper price. The presence of silver bronze will diminish the quantity to the pound, and seriously impair the standing quality of its color. Upon close examination the adulteration may be detected, however, as the pure aluminum, if placed on the finger nail, will look whiter and more silk-like than the adulterated substitute.

### ALUMINUM PAINT.

**A**LUMINUM, when reduced to powder, and mixed with a solution in water of gum-lac, gives a metallic paint which covers well, and may be shaded with aniline colors, dissolved in water. The solution of gum-lac is made by bringing to the boiling point a mixture of gum-lac and borax and an alkali, such as soda of ammonia.

The solution must contain at least from fifteen to twenty per cent of gum-lac. Aniline colors are added to produce the shade desired, and aluminum is added in sufficient quantity to produce a paint sufficiently fluid for application with a brush. The color is brilliant, very durable and impermeable, and may be applied to metal, paper, wood and wooden materials, yachts, etc. It may be rendered supple by the addition of a small quantity of glycerine.

## POSSIBILITIES OF ALUMINUM.

**I**F aluminum ever becomes available as a commercial product, there will be no limit to its uses, for it is far more abundant than any other metal or mineral. It is contained in common clay, of which it constitutes one of the chief ingredients. At present it cannot be got out of the clay except by burning the latter at a heat four times as great as that of the ordinary smelting furnace,—a heat that cannot easily be produced except by electricity; but the progress of chemistry is likely to discover some new and cheaper process of extraction. Some of the most alert minds in Germany, England and this country are concentrated on experiments with clay. Scores of patents have already been taken out in all countries. Any year may witness the solution of the problem and the creation of a metal which may relegate steel to the background.

## BRONZING LIQUID.

**D**O not use thick or turpentine liquids to mix your bronze. A thick, heavy bronze liquid, when mixed with bronze, will make it look like a yellowish paint covered with varnish, and despoil it of its metallic appearance. A turpentine liquid is even more dangerous, as the tendency of turpentine is to color the bronze greenish. Do not try to dissolve varnishes to make

bronze liquids yourself, but buy a carefully and specially prepared liquid for all purposes, and the result will be gratifying to yourself and your patrons.

Of course I have often met the objection that benzine liquid dries too quickly and could not therefore be used to advantage in the bronzing of hot radiator work. Just so. The work should not be bronzed hot, if this can possibly be avoided. I have met steam fitters who would heat a radiator up to its highest capacity, and then bronze it, so that the bronze would draw blisters if they just touched the radiator, claiming that this way of using it would consume less bronze and liquid; while if they had made comparisons on cold work they would have noticed that they had used not only considerably more material, but had done much inferior work. The heat or even moderate warmth in a radiator will hasten the drying qualities of the liquid to such a degree that it will dry almost under the brush, before a long, even line is drawn to make a smooth job. If the bronze has not time enough to settle, it will become streaky-looking, and must be done over the second time. Besides this, there is another disadvantage in bronzing warm radiators, and this is the danger of having the bronze change its color much sooner than on work that has been done on cold radiators. Every bronze liquid must contain a little oil, and this oil, if not dried out, will, when warmed by the radiator, invariably darken the bronze.

This could not happen if the liquid were given a chance to dry on cold work. If the work is done during the cold weather, it will be an easy matter to turn off the heat during the time of decoration without any annoyance to the inmates, who will insist upon having their radiators as good and attractive-looking as possible.

### PICTURE-FRAME GILDING.

IT is a well-known fact that nothing in modern times has been produced that is fully equal to gold leaf for the purpose of gilding picture-frames and other ornaments where color, brilliancy and durability are required. It has been the aim of all manufacturers and dealers to approach these qualities, and there has been many imitations placed upon the market which claim to be its equal, but in an experience of fifteen years I have failed to see their claim verified.

I can supply a bronze and liquid which I do not claim is equal to gold, but is the nearest approach to it of anything that has yet been produced. It is brilliant, durable, and very easily applied, and is an excellent substitute for gold leaf.



## BRONZING BY DIPPING.

**T**HE process of dipping in mixed bronze is a success on certain articles, such as light hardware, cast iron and sheet metal toys. The object being to color the article gold or aluminum where a very bright finish is not looked for.

While a fairly good finish can be obtained on iron by dipping, it is difficult to dip wood articles with good results, the wood being porous absorbs the liquid very quickly. This causes the bronze to separate, look thin and dull; it will also peel off.

The difficulty with bronze dipping is in keeping the bronzing material well stirred and of the proper consistency to adhere, cover and drip.

A tub for dripping should be made to slant toward the centre. A revolving roller to run slowly through the tub lengthways will keep the material well stirred.

A special bronze liquid is made for dipping purposes. A dipping liquid should be a light flowing liquid. It will drip and become hard in less than one hour.

## STRIPING BRONZES.

**G**OLD, aluminum and copper striping bronzes are the product of the higher grades of French leaf bronzes. After going through a process to extract the finer from the coarser particles, dried and polished, it is then ready for the consumer.

Gold and aluminum striping bronzes are mostly used by carriage painters, and would have been in greater demand by this trade if known to them where some could be procured and at a reasonable price. The writer has called upon scores of carriage painters during the past five years that have experimented with the ordinary bronzes. The results being very unsatisfactory, having bought their bronzes from jobbers and paint dealers who were not aware of the difference in striping from other bronzes.

In buying bronzes it is advisable to buy from the manufacturer.

To obtain best results with gold and aluminum striping bronzes it is necessary to use a proper size in mixing.

Many painters will mix turpentine and varnish with their striping bronze and wonder why the results are unsatisfactory.

Turpentine will discolor bronze, will cause it to crawl and turn a very dark greenish shade.

Gold size japan or ordinary japan are the best admixture for striping bronzes. For fine lines use gold size japan, for coarse lines use ordinary japan.

Gold striping is made in two shades—pale gold and rich gold. Copper striping is made in two shades—natural copper and dark copper. Copper is used largely by piano plate manufacturers and japanners.

Aluminum striping is a light silver shade ; is used largely on delivery and express wagons instead of flake white. It is lighter in shade, has better covering capacity, will wear longer and look better than flake white.

Aluminum striping bronze is so fine that it can be used for lettering by mixing and applying with a pencil like any ordinary japan color.

### HOW TO USE GOLD PAINT.

**M**IX in a shallow vessel a small quantity of the gold powder with sufficient liquid to give it the consistency of paint, and apply the mixture with a soft brush. Do not prepare more of the mixture than required for immediate use. A second application, when thoroughly dry, will improve the appearance of all objects on which this gold paint is used.

## LITHOGRAPHERS *and* PRINTERS

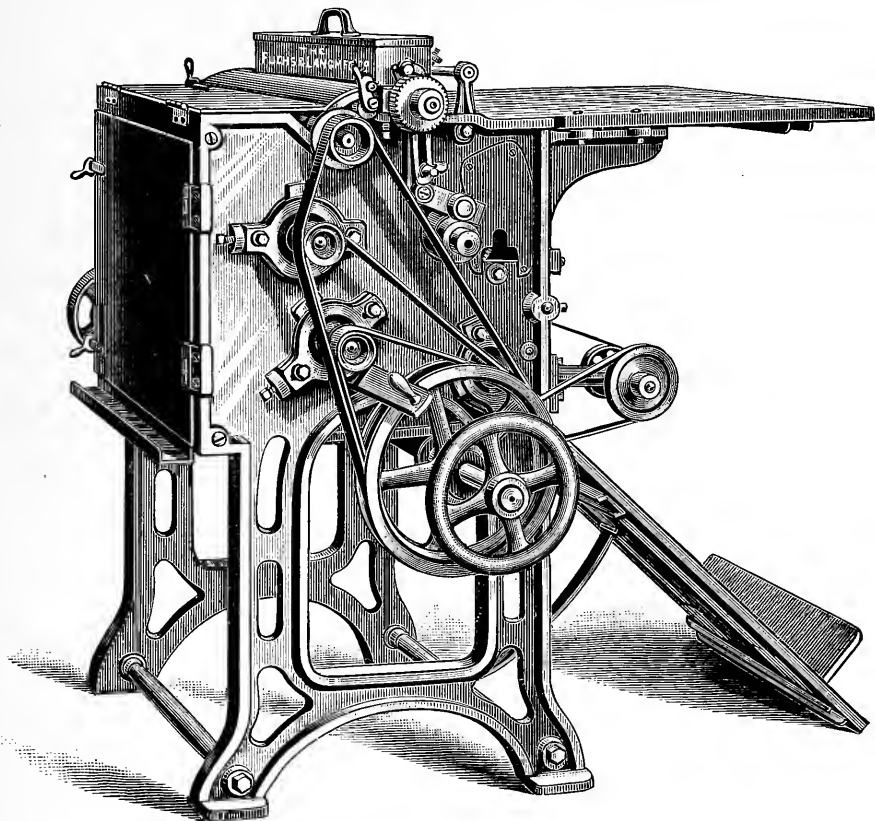
**T**HE consumption of Bronze Powder by the Lithographers and Printers, is greater than in all other lines of business where bronze powder is used. Until within a few years, lithographers and printers applied their bronze powder by hand, that is, after applying the gold size on their presses, they used a bronzing pad covered with chamois skin or beaver fur dipped in dry bronze powder, then lightly going over the surface sized, when it would be set one side to thoroughly dry, before dusting off to remove the superfluous powder from the sheets.

While many lithographers and printers continue to apply their bronze powder by hand, a majority of the larger, and many of the smaller houses, have adopted the new process of applying their bronze powder by machine, (a cut of which is shown on the following page).

## COMBINATION BRONZING AND DUSTING MACHINE.

Made in Fifteen Sizes.

To bronze sheets from 14 x 25 to 64 x 64 ; adjustable to all thicknesses of paper or card board. Will bronze from 1,000 to 2,000 sheets per hour, according to size of machine.



Will bronze sheets up to size 14 x 25.

SIZES :—14 x 25 ; 16 x 30 ; 20 x 30 ; 20 x 35 ; 25 x 36 ;  
25 x 38 ; 30 x 44 ; 34 x 50 ; 36 x 50 ; 36 x 54 ; 44 x 56 ;  
48 x 65 ; 64 x 64.

Provided with patent devices for applying, polishing and removing the superfluous powder from the sheets, which after being bronzed are deposited upon the delivery-board with the bronze side exposed to view. This machine has been manufactured during the past ten years, improvements being constantly added—1,500 are now in use in the United States and Canada.

It is acknowledged by the many lithographing and printing houses throughout the country who are now using the Combination Bronzing and Dusting Machine, that for the average class of work it will bronze and dust effectively in one operation. The machine is built on thoroughly scientific principles, and devoid of all unnecessary mechanism, one of the features being that all adjustments are made on the outside. Heavy, or thin paper can be bronzed and dusted equally well, without readjusting the machine. This patented improvement overcomes the great danger of the delivery roller being wrongly adjusted, and the sheets sticking in the machine. The fountain, which is also secured by patent, is the only effective fountain applicable to a bronzing machine. Besides the knives which regulate the flow of bronze, a sectional brush is attached in such a manner that the bronze is sprayed directly on the sheet, and away from the bronzing pads, this allowing them to do their work more effectively than by any other known process.

By setting any particular section of the brush closer to or farther from the fountain roller, a stronger or lighter flow of bronze will be sprayed on the sheet under that section.

No extra cams for different sized sheets are needed, as the flow of bronze can be regulated to any sized sheet by a set screw.

If a printer would consider the advantages of a Combination Bronzing and Dusting Machine he would not long be without one. It will thoroughly bronze and dust 1,000 to 2,000 sheets per hour, without scattering bronze, as happens when the work is done by hand, and saves a great deal of labor and more time.

The larger machines grip the long side of sheet, the same as a steam press does. This overcomes the danger of stretching a large sheet out of register and also facilitates the bronzing, as sheets need not be turned while travelling from the press to the bronzer.

Should it be necessary to change from one shade of bronze to another, the machine can be thoroughly cleaned in one half hour.


It has been said that the cheaper grades of bronzes are good enough for the average lithographer and printer. This is not so. In fact, the finer grades of bronzes are none too good. The lithographer and printer of today will not use cheap chemically made bronzes, they prefer the new Leaf Metal bronzes, especially where the work

is to be embossed after being applied. This new Leaf Metal bronze is especially adapted for the lithographer and printer. It can be worked on all grades of paper or card without sticking or smutting the stock, and gives an unusually fine, bright and finished appearance.

This bronze is destined to take the place of the high priced French Leaf bronze powders, because it will cover as much surface, does not adhere to the rougher kinds of stock, and possesses the same brilliancy and fineness. It is carefully made from the scraps of Dutch metal, the best obtainable article used in making high priced bronzes. It will also preserve its color and durability. The quality of this bronze will be maintained to a uniform standard and can be furnished in any desired shade, as follows :

Pale Gold,	Rich Gold,	Pure Gold,
Green Gold,	Deep Gold,	
Lemon,	Copper,	Orange,
Fire,	Crimson,	
Lilac,	Maroon,	Blue,
Silver,	Aluminum,	
High Red,	Yellow,	Olive Green,
Navy Blue,	Dark Blue,	
Dark Green,	Antique Green,	Sea Green,
Light Blue,	Grass Green,	
Rose,	Amaranth,	Violet,
Emerald Green,	Magenta.	

## BRONZE SIZING.

RONZE sizing is made in three shades, Yellow, Brown and White, and is ground to set quick, medium



and slow. For obtaining best results in bronzing, it is necessary to use a size specially adapted to the grade of paper or card to be bronzed, as well as the shade of bronze to be used. Yellow and Brown size is used for Gold and Colored bronzes, while White size is made specially for Aluminum bronze.

On glazed papers a special Glazed Paper Size must be used to obtain the best results. A regular size is liable to pick the glaze or allow the bronze to rub off when dry.

The cover of this booklet is bronzed with pure Aluminum bronze over white size.

## GOLD AND SILVER INKS.

**G**OLD and Silver Inks are used like ordinary inks, though it is necessary to follow certain rules to secure the best results. Gold and Silver inks should be flowed on the disc from a fountain, as it is necessary to use these inks freely to secure a lustre to the bronze. Use only rollers that have been in use a long time, that is, a dry roller. A new roller, being damp, repels the bronze and effects the lustre, especially on glazed paper.

Gold ink is made in two shades—Pale Gold and Rich Gold. Silver ink is made of Aluminum, and gives a white and silver-like finish.

A specially prepared varnish is used for thinning. Do not try to thin with ordinary varnish.

## ENAMEL *and* ENAMELLING

THE almost universal use of enamel, like bronzes, for work in which, hitherto, the house decorator and painter have been considered necessary, and at the same time the frequent misuse of these mediums, from ignorance in their application, call for a guide to their manipulation, with directions as to the treatment of different substances and articles. The very simplicity of the medium is a difficulty in itself, as people are apt to be careless about work that entails little or no trouble. Things that can be done at any time are very often not done at all, and so things that require no trouble are as often as badly done; therefore, whenever failure results in the use of enamel, it cannot be too emphatically stated that the fault rests with the operator. If the following simple directions are not followed, and the mistakes avoided, the material itself will not only be wasted, but the article under treatment spoiled.

Pure enamel does not dry quickly. If it did so it would chip, as do all the much-advertised imitations. Tin, to which it has been applied, can be dented without chipping or breaking the medium. Turpentine must rarely be added to the enamel, as it makes it dull. Thinning is not required in a pure enamel. Enamel should be ready prepared and in every particular fitted for im-

mediate use. For all large surfaces use a three-inch hog-hair brush; for radiators and bath tubs, a one and a half or two-inch brush. For smaller articles a one-inch badger-hair brush can be used with great advantage in painting an article. They produce a fine, smooth, liquid-looking surface, but are expensive. Brushes should be thoroughly cleaned with turpentine each time they are used, and to preserve them for future use they should be suspended in linseed oil. One gallon will cover forty square yards of a non-porous surface, or about a half-pint to two and a half square yards. It is well, when the wood is new, to give it a priming coating of common paint. This will render it non-porous and economize the enamel.

Terra-cotta articles ought first to be sized, as this ware is very porous. If preferred, a common paint may be used for the priming medium.

Picture-frames must be carefully washed before enamelling. For these, two thin coats will be sufficient.

Should any object, or any portion of a room, undergo much fingering or unusual wear and tear, one coat of clear enamel, after the color has thoroughly dried, will be found a first-rate preservative. There are very few articles of domestic use to which enamel is not applicable, and as stated further on, its value for decorative purposes cannot be made too well known.

Cold deteriorates its drying power. Keep the enamel always securely covered up, as the air will cause the contents to skin and become useless.

In fine summer weather open the windows and let the articles enamelled dry in the genial warmth.

## HINTS ON RADIATOR ENAMELLING.

**F**OR many years various kinds of paints have been experimentally used in decorating radiators, but none have been satisfactory and durable enough to take the place of bronze powder. As a consequence, no improvements have been made in the decoration of radiators, which, being a part of the ornamentation of rooms, are very awkward when failing to harmonize with the surroundings. In fine apartments it is very desirable that something besides the customary article be used, and to this end the enamel has been brought forward. By its use a beautiful and artistic effect can be produced, by selecting colors harmonious with the surroundings, and in good taste. Combinations with bronze colors are easily made, and thereby the appearance of the radiators changed from unsightly to ornamental features of the rooms.

Enamel is perfectly adapted to this kind of work, and has been thoroughly tested in all necessary conditions, and the results are entirely satisfactory, proving in

actual practice its ability to stand heat, even when subjected to very high pressure of steam.

Care has been taken to produce a line of shades which can be arranged to suit all tastes, and others will be forthcoming as occasion demands.

The enamel is easy to apply, and only requires two coats to produce a perfect surface which remains hard and glossy, allowing any discoloration, dust or dirt to be washed off without any injury to its appearance.

While the first cost is a trifle greater, it is more economical than bronze on account of its greater durability and remaining unchanged in color for years.

Special shades, to match any sample, made to order.

For the benefit of our readers, I will furnish good color combinations to those who will write me, stating the pattern of radiator used and the shades of the wall paper, carpets, etc.

Enamel can be used with admirable effect for steam and water radiators. In this direction there is a wide field for its usefulness. Enamels in all shades can be produced by tinting white enamel, and thereby obtaining any shade required for a radiator when being matched to wall paper, tinted walls, woodwork, etc. When a perfect match is obtained a pleasing effect can be had by touching the raised parts of the radiator with gold or silver bronze, or other bronzes to match or blend with the surroundings. The essential object in the decora-

tion is harmony,—harmony in design as well as color. This can be obtained with as pleasing results with simple materials and slight expense as with the most expensive elaboration. It is well to give radiators a coat of paint to act as sizing before applying the enamel. This coat should be what is termed a half-flat coat, and this coat should be thoroughly dried before applying the enamel. A very light heat will help the spreading of the enamel in cold weather.

### BATH TUB ENAMELLING.

A TIN bath tub will require three coats, very thinly applied. Each coat must be thoroughly dry before the next is added. This drying between the coats applies to every article enamelled. Thoroughly clean the bath, and see that it is perfectly dry before applying the enamel. Wherever there is a suspicion of grease, the article must be washed and dried. All articles that have been handled must also be washed. Ivory and snow-white are the best tints for bath enamelling. Also, be careful never to touch the enamel with the hands, as their warmth, and natural, if impreceptible, greasiness, injure the medium.

It is not necessary to remove old paint before using the enamel; if the surface is good and smooth, go straight over it. If it is rough, rub it equal and smooth

with sandpaper. Should it be requisite to remove the old paint, use turpentine or sandpaper; get as much off as you can, then rub the surface until it is quite smooth. It is a good plan to fill a bath, after it is finished and dry, with cold water, and to let it stand forty-eight hours. This will tend to harden the enamel.

The outside of an iron bath-tub should be enamelled before it is set in position. First, set the tub upside down. After filing off all rough places and thoroughly going over the surface with sandpaper, apply two coats of white zinc thinned with turpentine; sandpaper after each coating. Then apply two coats of enamel. In applying the enamel on bath tubs (inside or outside) draw the brush vertically. This will avoid running and sagging of the enamel. After which rub down with pumice stone and water; thick felt is used for this purpose. If properly done will produce a surface as smooth as glass.

### MIXING COLORS.

**I**N mixing colors for woodwork and interior decorations, where it is desired to produce a result in harmony with the wall hangings, a great deal of valuable time is frequently spent in getting suitable tints. The writer remembers spending the greater part of a whole day in endeavoring to satisfy the tastes of a customer of the gentler sex, who insisted that every attempt was out

of harmony, but who, strange to say, finally chose the very colors that had been suggested in the first place. In cases of this kind it is well to have on hand a portfolio of colors and tints. This would prove of immense advantage in all cases where colors were to be selected; but many decorators fail to keep them on hand, generally falling back on a sample book of plain-ground wall paper. This, however, gives no adequate idea of the appearance of a color when varnished or in oils, as, being entirely without gloss, they are taken by the uninitiated far too literally. Of course, they answer admirably for water colors, but in all other cases especially prepared samples are very useful to have on hand.

## HOW TO MIX PAINTS IN THE PREPARATION OF TINTS.

The first-named color always predominates.

Mixing dark green and purple makes bottle-green.

Mixing white and medium yellow makes buff tint.

Mixing red, black and blue makes dark brown.

Mixing bronze-blue, lemon-yellow and black makes dark green.

Mixing white, medium yellow and black makes drab tint.

Mixing white, lake and lemon-yellow makes flesh tint.

Mixing lemon-yellow and bronze-blue makes grass-green.

Mixing white and black makes gray tint.

Mixing white and purple makes lavender tint.



Mixing red, black and medium yellow makes maroon.

Mixing lake and purple makes magenta.

Mixing medium yellow and purple makes olive-green.

Mixing medium yellow and red makes orange.

Mixing white, ultramarine blue and black makes pearl tint.

Mixing white and lake makes pink.

Mixing ultramarine blue and lake makes purple.

Mixing orange, lake and purple makes russet.

Mixing medium yellow, red and white makes sienna.

Mixing white and ultramarine blue makes sky-blue.

Mixing ultramarine blue, black and white makes slate.

Mixing vermilion and black makes Turkey-red.

Mixing white, yellow, red and black makes umber.

## JAPANNING.

**J**APANNING is the process of giving to manufactured articles of tin, sheet metal and iron the appearance of lacquered wares. The colors mostly used in japanning material are black and light and dark brown. Black japan is a mixture of copal varnish and ivory drop black (ground in japan). Light and dark browns are a mixture of copal varnish and asphalt in sufficient proportions to produce the desired shade. Various shades are made by mixing copal varnish with colors ground in japan, the following colors being used : Indian red and vermilion, plain or glazed with carmine ;

coach painters' green, light, medium or dark blue, white, &c. Gold, copper and other shades of bronze powder can be used, and produce an excellent finish for piano plates and light hardware.

Do not undertake to mix your own japanning colors, but buy a carefully and specially prepared japan for all purposes, as you will find it cheaper and better. Use only bronze powder which shows perfectly dry and brilliant in the bulk, and is made with the addition of as little oil as possible, as this will keep its original color longer than bronze that is made with oil. Before applying the japan care should be taken to clean off all rust and oil, for if not thoroughly clean the japan will peel off.

Use a flat bristle brush of proper size in coating the articles with japan. The elasticity of the material makes this necessary to secure a smooth and even surface. On cheap tinned articles one coat is all that is usually applied. Sheet iron should if necessary have two coats, though one coat can be applied to cover thoroughly when put on by an experienced japanner. Large and small cast iron articles are coated with a brush, though small castings are often dipped and allowed to drip suspended from wires.

To produce a gold, copper or other bronze finish first coat the article with varnish size, allow the size to become nearly dry, or tacky, and then apply the bronze

with a velvet or plush pounce. Japanned and bronzed articles are given a coat of varnish immediately after being taken out of the baking oven, though this is only when a very smooth and glossy surface is required.

The process of mixing and applying being finished, it is necessary to place the article in the baking oven. These ovens are specially constructed for the purpose of baking japanned work. They are built in various sizes, according to the room required, usually of brick and having sheet iron doors, with tiers on inside walls. A steady temperature from 250 to 400 degrees F. is required, and articles remain in the baking oven from 12 to 48 hours. Heat is obtained by the use of coal, but recently gas has been introduced. The gas oven is preferred, being cleaner, gives a quicker and more steady heat, can be easily regulated and is less expensive to operate.

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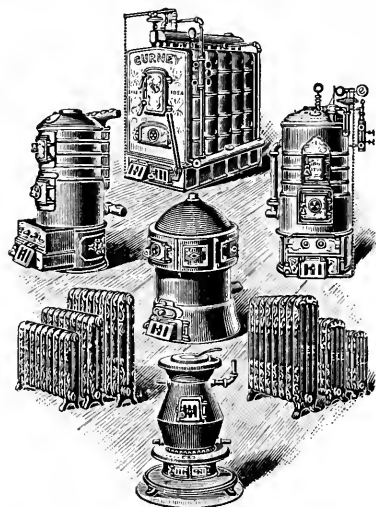
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